

The Failure of the Schlieffen Plan and Its Impact on the German WWI Strategy

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Abstract

During the outbreak of World War I, influential figures across Europe failed to predict a prolonged war. While the preliminary forecast by European powers that the war would be truncated has often been cited as evidence of the incompetence among those in power, the fact that these ideas were generally accepted among senior military theorists and strategists suggests that the prolonging factors were hard to detect. This research, therefore, provides an overview of the war and identifies conditions of the war considered as factors contributing to the prolongation of the war. Primary sources were used to substantiate and evaluate perspectives and claims from secondary sources. The analysis uncovered the debate over whether the plan was ever executed; certain perspectives suggested there only ever was a German *Moltke* plan. While Moltke did make amendments to the plan, many were simply revisions in response to international developments. Moltke's plan for a large part also used the strategies and principles of warfare outlined by Schlieffen. However, it must be noted that the research indicates that the failure of the Schlieffen plan as well as the amendments by Moltke while preventing a truncated war only extended the war due to trench warfare which was facilitated by developments in health and sanitation conditions as well as technology. As analysis of factors determining the length of a conflict offers valuable insight into forming post-war political and economic decisions, the prolongation of World War I is worthy of study.

Introduction

World War I was unprecedented in scale with 16 million deaths by the time of Allied victory (Britain, France, and Russia among others) in 1918 against the Central Powers (Germany, Austria-Hungary, Bulgaria, and the Ottoman Empire). The war was also *modern*, with it being fought on land, in the air, and at sea with new technologies including tanks and machine guns. The strategies of the war not only adapted to these developments but also to the cult of the offensive that developed among military strategists of the time.¹ The cult of the offensive describes the belief held by military leaders of the time that the advantages of the offensive were so great that failing to strike first would leave a state in the precarious position of being on the defensive. This cult was patently connected to the idea that continental war would be short and truncated.

In 1905 German General Chief of Staff Schlieffen devised a battle plan to successfully wage a two-front war, a plan that exemplified the cult of the offensive. Otto Von Bismarck's fear of a war on two fronts was fulfilled in 1894 after a Franco-Russian alliance that guaranteed mutual military aid in the case of a German attack.² The strategic handicap along with increasing tensions between Germany and the alliance provided the rationale behind the Schlieffen Plan. Schlieffen proposed that the fact France and Russia were separated was a German advantage. Schlieffen wrote that in a war on two fronts "the whole of Germany must throw herself upon one enemy, the strongest, most powerful, most dangerous enemy and that can only be France."³ This notion of a 'decisive battle' was vital to the German military doctrine of offensive battle, as the oracle of German military strategy, Carl Von Clausewitz believed that the occupation of enemy territory and resources were secondary to speed and an early decision as he feared a war of attrition. This inspired Schlieffen to devise a plan of envelopment as he wrote "The enemy's front is not the objective. The essential thing is to crush the enemy's flanks....and complete extermination by attack upon its rear."⁴

¹ Evera, Stephen Van. (1984) 'The Cult of the Offensive and the Origins of the First World War.' *International Security*, vol. 9, no. 1, 58, <https://doi.org/10.2307/2538636>.

² Limbach, R., n.d. Schlieffen Plan | German military history. Encyclopedia Britannica. Available at: <https://www.britannica.com/event/Schlieffen-Plan>. [Accessed 20 December 2021].

³ Ritter, G., 1958. *The Schlieffen Plan: Critique of a Myth*. 2nd ed. London: Oswald Wolff Limited, 171.

⁴ Ibid.

The plan was thus completed, Germany would spread a heavily one-sided right wing across Belgium sacking the French forces with Germany's deliberately weak left wing and descending upon Paris. However, in the opening months of the war, just over a year after Schlieffen's death, the Schlieffen plan along with the desired "decisive battle" failed.

The failure of the plan raises questions about its importance in the subsequent prolonging of the war. An understanding of factors that determine the length of conflicts such as the war in Ukraine can provide insight for peace-makers intent on hastening the end of the war. Furthermore, insight into the length of war can inform policy-makers tasked with strategizing for economic fallout that reduces living standards through inflation. This study aims to determine the primary reasons for the war's prolongation.

Reasons for Prolongation

Factor 1: The Schlieffen Plan

By 1906 Schlieffen intended on allocating six weeks and seven-eighths of the German forces to eliminate France while one-eighth held her eastern border from Russian incursion until the bulk of the army could be mobilised in the east. This was based upon German arithmetic that predicted that French and German mobilisation required two weeks while Russia would require six weeks due to the empire's rudimentary railroads, geographical size, and large numbers.⁵ This was believed to be an adequate time for a 'decisive battle' with the French.

In 1905 however, the right wing's envelopment necessitated a march through Belgium violating its neutrality guaranteed by Britain in a treaty in 1839. One could argue that the question regarding Belgium and her neutrality was a decisive factor in the prolonging of the war and the failure of the plan. King Albert I of Belgium responded to the German ultimatum by saying "Our answer must be no...Our duty is to defend our territorial integrity. In this, we must not fail."⁶ Before the first shot and casualty of the war, an assumption of the war plan was refuted. The German assault began on the forts of Liege where the fortresses held strong and in the first interactions of the war it was the German forces who were disproportionately killed. The German soldiers were also not aided by the hot weather, roadblocks, and blown-up bridges. The Germans who had calculated a free passage of their right-wing were free

⁵ Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin, 23.

⁶ Ibid.

to continue their march on the 17th of August.⁷ This did not change the fact that the German march through Belgium took 11 days rather than the anticipated two days. Buchan wrote that the German victory had portrayed their army as having “clay on their feet” to the rest of the world.⁸ Thus one could assert that the elimination of the image of a completely efficient army created in the Franco-Prussian War in 1871 undermined Germany’s ability to achieve a decisive victory. Cruttwell however argued that the Liege resistance, while surprising the Germans, did not significantly interfere with their plans, instead arguing that the demolition of railroads was a more significant blow.⁹ Echevarria argued that the ‘rigid timetable’ the Schlieffen plan required to be successful would have inevitably led to the plan’s failure, suggesting that Schlieffen overlooked the inevitability of the ‘fog and friction of war.’¹⁰ Mombauer on the other hand asserted that it was not the Schlieffen Plan that led to the delay in Belgium as the original plan involved the violation of Holland. Mombauer went on to suggest that Schlieffen had done this to march around Liege through Dutch territory and that it was Moltke’s decision to respect Holland’s neutrality that led to battles at Liege.¹¹ Tuchman disagreed with all perspectives presented by downplaying the impact of the Belgian resistance. Tuchman outlined that the German delay was only two days and not eleven. She argued that the march into France had not been scheduled to begin before the 15th of August.¹² Arguably the significance of the Belgium resistance was not in the equipment, personnel, or days lost by the Germans but in the fact that the war began contrary to the forecast of the Schlieffen Plan. In many ways, it could be argued that this error typified the reasons why the Schlieffen Plan failed to bring about a decisive victory.

Another perspective is that the Schlieffen Plan’s inability to cope with Britain’s expeditionary forces as anticipated led to an extended war by denying Germany a swift victory. Schlieffen had assumed that the right wing of the German army would defeat any British expeditionary forces. Trachtenburg for example argues that while Germany did what it could to keep Britain out of the war, it did not base its military

⁷ Edmonds, J., 1926. *Military Operations France and Belgium: Military Operations France and Belgium, 1914: Mons, the Retreat to the Seine, the Marne, and the Aisne August-October 1914*. 2nd ed. London: Macmillan, 33.

⁸ Buchan, J., 2009. *A History of the Great War*. 2nd ed. Edinburgh: BiblioLife.

⁹ Cruttwell, C., 1936. *History of the Great War 1914-18*. 2nd ed. Oxford: Academy City Publishers.

¹⁰ Echevarria II, A.J. (2001) ‘An Infamous Legacy: Schlieffen’s Military Theories Revisited,’ *Army History*, 53, 1.

¹¹ Ehlert, H., Epkenhans, M., Gross, G., Zabecki, D. and Foley, R., 2014. *The Schlieffen Plan*. 1st ed. University Press of Kentucky, 50.

¹² Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin, 210.

calculations on this hope.¹³ Furthermore, he placed a high value on Britain's blockade capabilities rather than its army.¹⁴ However, the importance of Britain's army in preventing the decisive victory of Germany is evident in the battle of Marne that took place after the Allies' great retreat between the 24th of August and the 5th of September. By September Moltke's army was at the doors of Paris and the 'Decisive victory' on the 39th day of battle was in sight. In the words of the French chief of staff, France needed the British "at any price" for the battle that would determine the "future of France."¹⁵ In the battle, the British army played a decisive role in forcing the German retreat as they exploited the gap in the German army and pushed through the centre of their line.¹⁶ Therefore the Schlieffen Plan failed to account for the British army's impact on their invasion of France. Taking that into consideration, it is reasonable to assert that the British navy, not the army, allowed the country to sustain its battle after the opening months.

A further view is that the Schlieffen Plan wrongfully assumed that Britain would not commit to a continental war leading to the prolongation of the war. While Schlieffen's logic was arguably sound surrounding his scepticism of an old treaty between Britain and Belgium, it failed to appreciate the strength of the Entente Cordiale. The British and French 'Cordiale' in 1904 was motivated by the British desire to secure the quickest trading route to the crown jewel of the empire, India, which was through the Mediterranean. This meant that the security of Britain's route to India was dependent on France's control of the Mediterranean.¹⁷ Therefore the involvement of Britain in the war due to an alliance with Belgium can be viewed as a *casus belli* and Britain would have opposed the Germans either way. Albertini was in favour of this perspective contending that Britain could not stand by while a war ensued on the main continent.¹⁸ However, Ferguson argues that Britain's involvement was unnecessary.¹⁹ If Ferguson's argument is accepted, arguably the involvement of Britain is less attributable to the failure of the Schlieffen Plan and more to British belligerency. Either due to the

¹³ Trachtenberg, M. (1990) 'The meaning of mobilization in 1914,' *International Security*, 15(3), 120. doi:10.2307/2538909.

¹⁴ Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin, 30.

¹⁵ Mott, C., 1934. *The Personal Memoirs of Joffre Field Marshal of The French Army*. 1st ed. New York: Harper and Brothers.

¹⁶ Herwig, H., 2009. *The Marne, 1914: The Opening of World War I and the Battle that Changed the World*. 1st ed. New York: Random House, 254.

¹⁷ Rogers, K. and Thomas, J., 2015. *Causes and Effects of 20th Century Wars*. 2nd ed. London: Pearson Education Limited, 20-23.

¹⁸ Albertini, L., 1957. *Origins of the War of 1914*. 1st ed. London: Oxford University Press.

¹⁹ Rogers, K. and Thomas, J., 2015. *Causes and Effects of 20th Century Wars*. 2nd ed. London: Pearson Education Limited, 39.

failure to predict British entry into the war or miscalculations about their impact; the question of Britain contributed to the plan's failure.

An additional perspective is that the failings of Germany in the battle of the Marne are less attributable to the Schlieffen Plan than Britain's unpredictable entrance. An argument is that the Secretary of State Sir Edward Grey's speech to parliament 3rd of August is what brought Britain into the continental war.²⁰ An extract of the speech can be found below:

“It may be said, I suppose, that we might stand aside, husband our strength, and that, whatever happened in the course of this war, at the end of it intervene with effect to put things right, and to adjust them to our point of view. If, in a crisis like this, we run away [Loud cheers.] from those obligations of honour and interest as regards the Belgian treaty, I doubt whether, whatever material force we might have at the end, it would be of very much value in face of the respect that we should have lost.”²¹

Grey, arguably, did not appeal to practical reasons for entering the war but to pathos. He stressed the honourable obligations of Britain and after this speech, an ultimatum to Germany to stop the invasion of Belgium was sent. The arguable lack of practical rationale for Britain's entrance (pathos not logos) means the Schlieffen Plan could not have prepared for this unpredictable event of Britain's entry. Tuchman however claimed that while Grey did appeal to Britain's honour, the deciding factor was his appeal to the practical factors such as the control of the Mediterranean.²² However, Barnett's thesis is that Britain underwent a moral revolution whereby ethical standards were more important than the opportunistic interests of Britain.²³ If Britain did undergo a moral revolution Britain's entrance into the war due to Grey is arguably evidence of this. On the other hand, it could be argued that if Barnett is correct Britain's entrance into the war due to moral reasons was part of a pattern suggesting that Schlieffen could have predicted Britain's action. Barnett however did suggest this revolution began in the early 20th century making it too early for Schlieffen to account for it. Either due to an incorrect assumption or the oratory skills of Grey, Britain was drawn into the war due to the invasion of Belgium.

²⁰ The Long, Long Trail. 2022. Sir Edward Grey's speech on the eve of war: 3 August 1914 - The Long, Long Trail. Available at: <https://www.longlongtrail.co.uk/battles/sir-edward-greys-speech-on-the-eve-of-war-3-august-1914/>. [Accessed 12 February 2022].

²¹ *ibid.*

²² Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin.,127-130.

²³ Barnett, C., 2002. *The Collapse of British Power*. 3rd ed. London: Pan Books, 24.

Counters

Factor 2: The Moltke Plan

While there were parallels between the Schlieffen plan and the plan Moltke carried out, his changes, dubbed ‘the Moltke plan,’ could be argued to have undermined the decisive victory Germany had sought, thus prolonging the war. According to Zuber, there was only ever the Moltke plan and the Schlieffen plan was simply a postwar invention.²⁴ Thus, Mombauer questions Zuber’s thesis, noting that Moltke himself referred to Schlieffen’s ideas saying the plan was a topic of debate before the outbreak of the war. Gerhard P Gross took a stern stance in response to Zuber by stating that the plan did exist and was “the basic operational strategic doctrine” for Germany.²⁵ Regardless of Zuber’s thesis, this investigation will explore the changes made by Moltke to the deployment plan before and during the war.

There is an argument that the difference between the plans on the question of the eastern front extended the war by preventing a victory in September of 1914. This was because Moltke was less inclined to expose his eastern front for a stronger right wing. Not only did Moltke say in a memorandum in 1912 that “we need to increase our troops in the area [Eastern Front]” but also considered an offensive in the east. All of which were contrary to Schlieffen’s ideas. In the build-up to the Battle of Tannenberg in the East, Moltke (on August 25th) decided to withdraw two corps from the Western Front to be deployed as reinforcement in the East. This was possibly the deciding factor in the battle of the Marne as it led to a 50-kilometre gap in the German offensive line that was discovered by Allied air reconnaissance.²⁶ Both the British and French armies exploited this gap and forced a German retreat between the 9th and 13th of September marking the end of the Schlieffen Plan. It is possible that one of the two corps that were sent to the Russian frontier could have filled the gap in the German offensive line and thus completed the siege of Paris. Moltke’s adjustments to the plan were justified by the Russian military’s advancements since 1905 evidenced by their mobilisation in two not six weeks. Therefore, one could argue that Germany’s failure was inevitable regardless of Moltke’s decision. This perhaps substantiates the ideas put forward by historians such as Ritter who had found Schlieffen’s memorandum and other documents in 1953

²⁴ Zuber, T. 1999. ‘The Schlieffen Plan Reconsidered.’ *War in History* 6(3), 262-305. Available at: <https://www.jstor.org/stable/26013926>. [Accessed 27 March 2022].

²⁵ Ehlert, H., Epkenhans, M., Gross, G., Zabecki, D. and Foley, R., 2014. *The Schlieffen Plan*. 1st ed. University Press of Kentucky., 85.

²⁶ Mead, P., 1983. *The Eye in the Air*. 1st ed. London: HMSO., 52.

in the US National Archives after many of Schlieffen's documents in German military archives were lost due to bombing in World War II and argued that the plan was 'deeply flawed and reckless.'²⁷ However, the two corps that were transferred to the eastern front arrived after the German victory in the east, thus they played no role in either battle.²⁸

Holmes however questions the notion that Moltke did weaken the western flank. He argues that while Moltke's ratio of the left wing to the right wing was 3:1, he also suggests that Schlieffen's plan did not dictate the 7:1 ratio assumed by most historians. Instead, Holmes argues that Schlieffen's plan also dictated a ratio of 3:1.²⁹ Most other historians disagree with this analysis and Zuber highlighted the fact that Holmes based his conclusions on a short, garbled, and tendentious summary of the exercise in the 1938 article by Generallieutenant Von Zoellner.³⁰ While Zuber's assertion is part of his greater critique of the Schlieffen plan's existence, the fact that other historians such as Mombauer and Strachan prescribe to the 7:1 thesis suggests that Holmes's findings have not been sufficiently persuasive.

The Moltke plan prolonged the war due to his rejection of the order in the Schlieffen plan to violate Holland's neutrality. Moltke wanted Holland to serve as a "windpipe" so that, if necessary, a longer war "could be survived." Therefore, one perspective is that the Moltke plan's stance on Holland was evidence of a strategy for a longer war. In fact, in 1906 Moltke predicted that a "national war" will not be "settled by a decisive battle but a long wearisome struggle with a country."³¹ Holland remaining neutral meant that the Entente, under international law, could not blockade the country, so despite any blockade attempts by the Entente, Germany could receive goods through Holland. For example, between 1913 and 1915 Dutch Cheese exports to Germany had doubled.³² However, Moltke still followed a strategy with the intention of a decisive victory. Tuchman's perspective was that planning for the more predictable and simple short war was easier, leading to him doing exactly that.³³ Tuchman's argument is weakened by the fact that Moltke did not violate Holland's neutrality which would have benefitted a short

²⁷ Lieber, K.A. (2007) 'The New History of World War I and What It Means for International Relations Theory,' *International Security*, 32(2), 160-161.

²⁸ Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin, 339

²⁹ Holmes, T.M. (2014) 'Absolute Numbers: The Schlieffen Plan as a Critique of German Strategy in 1914,' *War in History*, 21(2).

³⁰ Zuber, T. (2001) 'Terence Holmes Reinvents the Schlieffen Plan,' *War in History*, 8(4), 470-471.

³¹ Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin., 339

³² Strachan, H., 2014. *The First World War*. Simon & Schuster UK., 210.

³³ Tuchman, B., 1962. *The Guns of August*. 1st ed. Penguin, 27-28.

war, suggesting he did have preparations for a long war. This is because Germany would have been able to avoid the forts of Liege and utilise the Dutch Railways. However, Herwig argues that despite the Schlieffen Plan, most senior military planners accepted the notion of a long war.³⁴ Perhaps, it was the indecision that arose from the desire to execute the Schlieffen Plan in accordance with the Cult of the Offensive and the realisation that the war may be extended, that ultimately led to an inability to plan for either, thus promulgating the war.

Factor 3: Trench Warfare

After the battle at the Mons in 1914 the predominant warfare became those of trenches in the Western Front. These long and deep ditches were fortified and strung out in a stepped pattern running back to support lines. Ahead of the trenches were wires of ‘double aprons’ intent on stalling infantry movement through battlefields. The spaces between opposing trenches became known as ‘No Man’s Land.’³⁵ The objective behind trenches was to defend one's position and attempt to break through the enemy's rear.

The advent of trenches led to warfare that favoured the defensive, stagnating military progress and extending the war. The fact that the biggest losses in the war came when either side was on the offensive is evidence of this. German deaths for example were highest in the Western Front, Eastern Front, and Western Front in 1914, 1915, and 1918 respectively. This indicated that casualties were highest when their army was on the offensive as these dates correspond with the years when German forces were on the offensive. Furthermore, during the battle of the Marne in September of 1914, French soldier deaths peaked at 238,000. The next worst month for France was in October of 1915 when 180,000 soldiers died during the French offensive in Champagne. Deaths only exceeded 100,000 three times after this and two took place in 1918 when the war became mobile.³⁶ Strachan argues that this was because trenches protected soldiers from the firepower of the nineteenth century. This, therefore, stagnated progress as both armies were discouraged from advancing. A view contrary to Strachan’s is that increased deaths

³⁴ Herwig, H.H. (2002) ‘Germany and the “Short-War” Illusion: Toward a New Interpretation?’, *The Journal of Military History*, 66(3), 681. doi:10.2307/3093355.

³⁵ Dunleavy, B., 2021. ‘Life in the Trenches of World War I. HISTORY.’ Available at: <https://www.history.com/news/life-in-the-trenches-of-world-war-i#:~:text=the%20Civil%20War,-,Trenches%E2%80%94long%2C%20deep%20ditches%20dug%20as%20protective%20defenses%E2%80%94are,common%20throughout%20the%20Western%20Front.> [Accessed 22 January 2022].

³⁶ Strachan, H., 2014. *The First World War*. Simon & Schuster UK,160.

during offensives did not encourage entrenchment as casualties were simply a part of military advancement. However, the battle of Champagne proves that the death toll of the attacking army typically exceeded that of the defender, as in this battle 30,000 more French soldiers (on the offensive) died than German soldiers. This idea was shared by Napoleon I who asserted that a battle where the enemy is entrenched must be avoided.³⁷

The tactic of attrition behind trench warfare was arguably another prolonging factor. Following the failures of the initial war plans and subsequent offensives the powers reverted to a tactic of attrition, creating stalemate. This was best encapsulated by William Robertson, a British Army officer who said “We can only end the war in our favour by attrition or breaking the German Line.”³⁸ As mentioned breaking the German line was not possible as trenches made large offensives impractical. Furthermore, General Rawlinson of the British army argued that attacks should aim only to take “bites” out of the enemy line.³⁹ The dangers of the offensive and the protection of the trenches lead to the armies attempting to exhaust one another instead of implementing a decisive blow. According to Schmitt however, the inability to break the deadlock reflected poorly on the general’s ‘imagination.’⁴⁰ Clemenceau, Prime Minister of France from 1906-1909 and again from 1917-1920, reflected this sentiment stating that “War was too important to be left to generals.”⁴¹ This indicates that the tactic of attrition was not adopted out of necessity but incompetence. However, Boff believes that there was not any realistic alternative to attrition that would have reduced bloodshed and hastened progress.⁴² This is arguably supported by the fact that major offensives were constrained by the lack of real-time communications, not just the realities of trenches and attrition. This is because the main method of communication was through human runners who often carried outdated information, assuming they even survived. Boff’s perspective suggests that attrition was not a prolonging factor but was necessitated by other prolonging factors. An assumption underpinning this argument however is that strategies for a longer war could not have been drafted by the powers. It is possible that had major

³⁷ Hart, P., 2014. *The Great War*. 2nd ed. London: Profile Books, 124.

³⁸ French, D., 1988. *The Meaning of Attrition*. 1st ed. The English Historical View, 398.

³⁹ Strachan, H., 2014. *The First World War*. Simon & Schuster UK, 178.

⁴⁰ Evera, S.V. (1984) ‘The Cult of the Offensive and the Origins of the First World War,’ *International Security*, 9(1), 58. doi:10.2307/2538636.

⁴¹ Mallinson, A. (2016) *Too important for the generals: Losing and winning the First World War*. Rearsby, Leicester: WF Howes Ltd.

⁴² Boff, J., 2018. *Fighting the First World War: Stalemate and attrition*. British Library. UK. Available at: <https://www.bl.uk/world-war-one/articles/fighting-the-first-world-war-stalemate-and-attrition> [Accessed 15 March 2022].

powers had the foresight to forecast the stalemate and strategized beforehand, there could have been a break in the deadlock.

Factor 4: Sanitary and Health Conditions

Despite the poor sanitary conditions inherent in trench warfare, the advancements in medicine and healthcare helped prolong the war by making such warfare feasible. The trenches along the Western Front were ideal conditions for the spread of disease. There were rats that not only spoiled food but spread diseases, blood-sucking louse that infected 95 percent of British soldiers departing from the Western front, and lice that spread trench fever and typhus. The well-tilled, cultivated, and manured soil also meant wounds were rapidly infected, with 21 percent of French soldiers dying from wounds in the legs or thighs as a result. Furthermore, approximately 1 million soldiers were infected with trench fever during the war.⁴³ However, these were the first armies to reap the rewards of antiseptics, mass inoculation programmes, and a greater understanding of bacteriology.⁴⁴ This is arguably evidenced by the fact that despite the trench warfare, battle not disease was the major killer. This is significant as in wars before 1914 disease had been the principal cause of death. In the Napoleonic Wars *eight times* more British soldiers died from disease than battle wounds.⁴⁵ These preventive military medicines allowed the attrition tactics of trench battles to occur and thereby prolong the war since deaths caused by battle were not augmented by the spread of diseases. This however is potentially weakened by the fact that the quantity of soldiers, not their health, may have mitigated the issue of disease-related death. For example, in France, the population grew by 2 million between 1810 and 1914 while the number of conscripts rose from 60,000 to 2.9 million during the wars on both dates.^{46,47,48,49}

⁴³ Anstead, G.M. (2016) 'The Centenary of the Discovery of Trench Fever, an Emerging Infectious Disease of World War 1,' *The Lancet Infectious Diseases*, 16(8). doi:10.1016/s1473-3099(16)30003-2.

⁴⁴ Strachan, H., 2014. *The First World War*. Simon & Schuster UK, 159.

⁴⁵ A Connolly, M., 2002. 'Deadly Comrades: War and Infectious Diseases,' *The Lancet*, 360(1), 23-24. Available at: [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(02\)11807-1.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(02)11807-1.pdf) [Accessed 16 April 2022].

⁴⁶ Napoleon-series.org. n.d. World Population: Europe 1810. Available at: https://www.napoleon-series.org/research/abstract/population/population/world/c_world2.html. [Accessed 6 September 2022].

⁴⁷ France-pub. 2014. '1st August 1914, General Mobilization in France.' Available at: <https://www.france-pub.com/forum/2014/08/01/mobilization-france/#:~:text=With%20the%20First%20World%20War,general%20mobilization%20in%20France%20begins.> [Accessed 6 September 2022].

The increased health can also be attributed to improved nutrition. George puts forward the idea that the division of rations into trench, emergency, and reserve were an important innovation in the development of a more effective rationing system.⁴⁸ While improved nutrition increased health, arguably its impact was not as great as the impact of improved general healthcare and sanitary conditions. This is because improvements in these areas directly prevented death through the treatment of infections and other ailments. However, others may argue that while infections were an issue that was somewhat mitigated in the trenches of the Western front, other diseases in other theatres of the war were of greater significance. For example, 1.5 million soldiers died of malaria, many of which occurred in sub-Saharan Africa where prevention initiatives were often lacklustre and disorganised.⁴⁹ While war outside of Europe was of importance to the war, it is undeniable that the main theatre of the war was Europe. Stevenson for example argues that the Western Front was where the war was decided.⁵⁰ Thus, it could be argued that conditions on the Western Front were of greater significance, despite the importance of casualties in other theatres.

Factor 5: Technology

It could be argued that munitions production prolonged the war. Many factories among the industrial powers converted to the production of munitions for the war. This allowed battles, which would have been called campaigns in years previous, to last for months. Strachan argued that in the short term, the increased output led to decreased quality in munitions. He argues that despite the mitigation of shell shortages, other issues arose. For example, in the battle of Somme, 25 percent of British guns were not functional due to design flaws and poor materials.⁵¹ Therefore it is possible that the increased production did not help prolong attritional battles. However poor-quality munitions may have helped lengthen the war as it denied any power a technological advantage or means of breaking through the deadlock. The importance of poor production is arguably low as both sides of the war switched from lighter weapons to medium and heavier ones suggesting an emphasis on

⁴⁸ George, E., 2012. *Then & Now: The Evolution of Army Rations*. Army Historical Foundation, 17(4), 67. Available at: <https://www.jstor.org/stable/26363064>. [Accessed 19 April 2022].

⁴⁹ Brabin, B.J. (2014) 'Malaria's Contribution to World War One - the Unexpected Adversary,' *Malaria Journal*, 13(1). doi:10.1186/1475-2875-13-497.

⁵⁰ Stevenson, D., 2004. *1914-1918: The History of the First World War*. London: Allen Lane.

⁵¹ Strachan, H., 2014. *The First World War*. Simon & Schuster UK, 167-169

sophistication (for example Britain after 1915).⁵² Therefore the nearly simultaneous switch allowed the powers to use their munition production as a force multiplier sustaining their attritional battles. Either due to poor quality in munitions or advancements in munitions the stalemate on the western front was arguably a result of munitions that supported attritional battles.

Moreover, the improved and increased railway systems helped sustain the war. In order to support the large armies, bullets, bandages, artillery, and many more items had to be manufactured and transported to the battlefields. By 1918 a division of 12,000 men required 1,000 tonnes of supply every day.⁵³ This level of supply, regardless of production capabilities, was only feasible through efficient transportation provided by railways that only became widespread in the late 19th century. The light railways allowed the quick-firing rifles that dominated trench warfare to be re-supplied.⁵⁴ Other forms of transportation were inadequate at the time as poor roads, heavy rainfall, and the bogging down of mud roads by heavy lorries reduced the efficiency of motor vehicles.⁵⁵ However, the importance of railways is arguably overstated as it is possible that the ability of the railway to supply the fronts was dependent on a static war. Thus, it is sound to assert that the advent of railways itself is not a factor that extended the war but a factor that perpetuated the prolonging of other factors. This idea is shared by Shimshomi who argues that the means of transportation in the Great War strongly favoured the defender and thus incentivised a defensive strategy, just as trenches did.⁵⁶ A different perspective however is that technology is the factor that prolonged the war to the greatest extent, since attritional battles and mass production could arguably only be a factor that contributed to the war's prolongation when paired with the railway networks. This is because the attritional battles needed to be supplied and the munitions needed to be transported. Furthermore, the failure of the Moltke plan can be attributed to technology. Moltke's (arguably fatal) mistake of sending troops to the Eastern Front was only rationalised by Russia's improved railway that enabled their army to

⁵² Fleischer, W., 2017. *Military Technology of the First World War*. 1st ed. Barnsley: Pen & Sword Military, 70-74.

⁵³ IWM. 2022. 'Transport and Supply During the First World War. Available at: <https://www.iwm.org.uk/history/transport-and-supply-during-the-first-world-war>. [Accessed 2 June 2022].

⁵⁴ Strachan, H., 2014. *The First World War*. Simon & Schuster UK, 164-169

⁵⁵ IWM. 2022. 'Transport and Supply During the First World War. Available at: <https://www.iwm.org.uk/history/transport-and-supply-during-the-first-world-war>. [Accessed 2 June 2022].

⁵⁶ Shimshoni, J. (1990) 'Technology, Military Advantage, and World War I: A Case for Military Entrepreneurship,' *International Security*, 15(3), 188. doi:10.2307/2538911.

mobilise quicker than anticipated. This would suggest that technology, specifically the railway, has a crucial role in the lengthening of the war. This is weakened by the fact, as previously mentioned, that regardless of Russia's mobilisation Germany may have been able to achieve swift victory had it not committed soldiers toward the Eastern Front.

Conclusion

World War I was arguably extended due to not one but multiple factors. This would also explain the reason why experts of the time were unable to forecast the prolongation of the war as it was an amalgam of different factors. While it is true that had the Schlieffen or Moltke plan not failed the war may not have been prolonged, this does not necessarily explain the continuation of the war for over four years thereafter. It is possible that the two sides of the war being of equal strength nullified the alliances' ability to advance after the failure of the initial war plans. This potentially led to the battles of attrition. However, the battles of attrition may have been shorter or not feasible had it not been for the mitigation of disease and infection due to improvements in sanitary and health conditions. Furthermore, the advancements in technology namely munitions and railways, arguably allowed for attritional battles to occur on a technical level. Additional technology did not shorten the war as each side of the war managed to mirror one another's advancement. Thus, while the Schlieffen and Moltke Plan prevented a short war, trench warfare, made sustainable by improvements in sanitary and health conditions and by improvements in technology, ultimately led to the extension of the war.

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